CLAIM(S):

1. A method of determining head-media spacing (HMS) due to waviness of a disc media surface, comprising:

generating an interpolated air bearing transfer function for a spectral density comprising:

providing a simulated disc topography having a wavelength;

selecting a head to model;

providing air bearing code for the head selected;

providing operation parameters;

determining an air bearing transfer function from the air bearing code;

simulating the head passing over the disc topography with the air bearing code;

determining simulated head-media spacing modulation for each of a plurality of disc wavelengths;

interpolating the air bearing transfer function with gradations of the wavelengths to provide the interpolated air bearing transfer function for the spectral density;

generating a power spectral density function comprising:

sampling actual disc topography of the disc media surface;

discrete Fourier transforming the actual disc topography sampled to a frequency domain to provide a sample topography spectrum;

root-mean-squaring the sampled topography spectrum to provide the power spectral density function;

convolving the power spectral density function with the air bearing transfer function to provide an HMS modulation spectrum for the sample topography spectrum; and

summing the HMS modulation spectrum to provide a value for the HMS of the disc media surface sampled.

2. The method of claim 1 wherein the providing of the simulated disc topography comprises providing a sinusoidal waveform having amplitude set at unity.

3. The method of claim 3 wherein the wavelength is in a down track direction.

4. The method of claim 3 wherein the operation parameters comprise at least one of linear velocity, temperature and ambient pressure.

5. A method of determining a portion of a head-media spacing modulation spectrum of a portion of an actual disc media surface, comprising:

simulating a head passing in near proximity to a simulated disc media surface to generate an air bearing transfer function for a spectral density;

generating a topography function for the actual disc media surface; and

multiplying the topography function and the air bearing transfer function to provide the head-media spacing modulation spectrum.

6. The method of claim 5 further comprising summing the head-media spacing modulation spectrum to provide a head-media spacing waviness value for the disc media surface.

7. The method of claim 5 wherein the generating of the power spectral density function comprises:

sampling topography of the portion of the actual disc media surface;

translating the actual disc topography sampled to wavelengths to provide an sampled topography spectrum; and

averaging the sampled topography spectrum to provide the topography function.

8. The method of claim 5 wherein the simulating comprises:

providing a simulated disc topography having a wavelength;

selecting a head to model;

providing air bearing code for the head selected;

providing operation parameters;

determining an air bearing transfer function from the air bearing code;

determining simulated head-media spacing modulation for each of a plurality of disc wavelengths; and

interpolating the air bearing transfer function with gradations of the wavelengths to provide the air bearing transfer function for the spectral density.

9. The method of claim 5 further comprising:

providing a group of substrates;

determining head-media spacing for waviness for each substrate in the group of substrates; and

determining head-media spacing for roughness for each substrate in the group of substrates.

10. The method of claim 9 further comprising:

square-root summing the head-media spacing for roughness and the head-media spacing for waviness for each substrate in the group of substrates; and

correlating results from the square-root-summing.

11. The method of claim 5 further comprising providing a model for glide avalanche (GA), the model comprising:

an equation where the GA equals

$$a\,[\Lambda^2(\lambda)Y(\lambda)d\lambda]^{1/2} + b,$$

where a and b are constants, Λ is an air bearing transfer function, Y is a topography function, and λ is wavelength.

12. The method of claim 11 wherein the model comprises integral boundaries from zero to one revolution of the disc media.

13. The method of claim 5 further comprising providing a model for glide avalanche (GA), the model comprising:

an equation where the GA equals

$$a[Y(\lambda)d\lambda + \Lambda^2(\lambda)Y(\lambda)d\lambda]^{1/2} + b,$$

where a and b are constants, Λ is an air bearing transfer function, Y is a topography function, and λ is wavelength.

14. The method of claim 13 wherein the model comprises a constant c for breaking the equation into two integrals.

15. The method of claim 14 wherein the constant c is between high frequency region and resonant frequency region.

16. A method of determining head-media spacing (HMS) modulation model, comprising:

providing a simulated disc topography having a wavelength;

selecting a head to model;

providing air bearing code for the head selected;

providing disc drive operation parameters;

determining an air bearing transfer function from the air bearing code;

simulating the head passing over the disc topography with the air bearing code; and

determining simulated head-media spacing modulation for each of a plurality of disc wavelengths.

17. The method of claim 16 further comprising interpolating the air bearing transfer function with gradations of the wavelengths to provide the air bearing transfer function with enhanced spectral lines.

18. An apparatus for determining head-media spacing (HMS) due to waviness of a disc media surface, comprising:

means for generating an interpolated air bearing transfer function for a spectral density and a power spectral density function for a sample topography spectrum; and

means for providing an HMS modulation spectrum for the sample topography spectrum using the power spectral density function and the air bearing transfer function.

19. The apparatus of claim 18 further comprising means for summing the HMS modulation spectrum to provide a value for the HMS of the disc media surface sampled.

20. The apparatus of claim 19 wherein the means for generating comprises means for simulating disc topography.